LITTER DECOMPOSITION AFTER CLEARCUTTING PINUS RADIATA PLANTATIONS IN CATALONIA (NE SPAIN)

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Needle litter decomposition and N dynamics were assessed for one year in an old first rotation *Pinus radiata* forest and in a nearby recently clearfelled area, 100 km North from Barcelona (Catalonia). The study was carried out from April 1989 to April 1990.

Mean annual temperature was 15.8°C and precipitation amounted 710 mm during the period of experimentation. Soils are Xerochrepts (US Soil Taxonomy), developed from granite rocks. The sites had been chesnut forests before the pines were planted.

After clearfelling, slash were piled and burnt (ashes covered less than 3 % of the plot surface). Green and senescent needles were incubated over the remaining forest floor in this plot while only senescent needles were incubated in the control (old plantation) plot. Nitrogen concentration were 14.9 and 10.0 mg N/g in green and senescent needles respectively.

Organic matter loss was significantly higher in the control plot, amounting a 37.4 % loss which corresponds to a decay coefficient (Olson, 1963) k= 0.47. Previously reported weight loss measurements for *P. radiata* senescent needles ranged from 21 % to approximately the same values obtained in this present work (Versfeld, 1981; Will et al., 1983; Baker & Attiwill, 1985; Baker et al., 1989). Litter decomposition peaked in November-December 1989. Mild temperatures, high rainfall and mulching provided by recently fallen needles in the control plot (maximum litterfall occurred in this time of the year) may have allowed increased decomposer activity. Decay rate was close to 1 when calculated from litterfall (A) and forest floor L layer accumulation data (Xss), e.g. k= A/Xss (as quoted by Olson, 1963); this value accounts for organic matter mineralization and litter transfer to the underlying F layer, defined on the basis of morphological degree of decomposition, whereas the k obtained from litterbags only takes into account mineralization.

Rates of needle weight loss in the clearcut area were not dependent on needle quality. Litter weight losses after one year of incubation were 26.2 % for senescent needles and 25.1 % for green needles (Olson's decay coefficients 0.30 and 0.29 respectively).

In the green needles, N concentration increased from the beginning of the period of incubation and absolute amounts of N remained constant; their C/N ratio ranged from an initial value of 30 to 25.9 after one year of incubation. N concentration in senescent needles from both sites decreased the first month of decay and then incresed to recover the initial values after 7 months of incubation; absolute amounts of N also showed the first-month decrease and afterwards remained nearly constant. The C/N ratio evolution for senescent needles was: initial 48.9, after one month 78.7, after 7 months 47.1. The pattern described for N evolution in Mediterranean forest floors (Hereter & Vallejo, 1986) show an initial period of net N immobilization in litter having C/N ratios above 25. In this way, the periods of C/N decrease in the present study would correspond to the microbial decomposition process while the early N loss observed in the incubated senescent needles only could be explained by leaching of N-rich compounds, perhaps in relation to soluble aminoacids and phenolics accumulation during needle senescence. In New Zealand *P. radiata* plantations, Baker et al. (1989) did not observe leaching losses from fresh or dried needles.

From litterbags incubation, net N release (mineralization + leaching) from the L layer was 14.6 kg N/ha/year in the control plot and 10.6 kg N/ha/year in the clearcut plot.

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